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**OCCURRENCE AND PATHOTYPING OF COWPEA MILD MOTTLE VIRUS  
(CPMMV) IN WESTERN KENYA**

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A thesis submitted in partial fulfilment of the requirements for the award of the degree of Master of Science in Crop Protection of Masinde Muliro University of Science and Technology

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## DECLARATION

This thesis is my original work prepared with no other than the indicated sources and support and has not been presented elsewhere for a degree or any other award.

Signature.....

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Date.....18/03/2015

## APPROVAL

The undersigned certify that they have read and hereby recommend for acceptance of Masinde Muliro University of Science and Technology a thesis entitled "*Occurrence and pathotyping of Cowpea mild mottle virus (CPMMV) in western Kenya*".

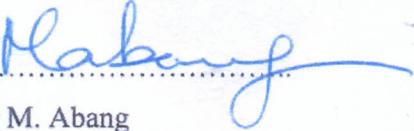
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Cowpea, *Vigna unguiculata* (L) Walp, is among the most important food legume crops in the tropics. In Kenya, cowpea yield is estimated at 0.53 tonnes/ha of dry seeds which is low compared to 1.86 tonnes/ha in United States of America (USA). Viral diseases are among the major constraint to cowpea production. Cowpea Mild Mottle Virus (CPMMV) is among the major viruses infecting cowpea and other legumes of economic importance. The status of viral diseases on cowpea in western Kenya had not been established. Furthermore farmers continued to grow cowpea varieties whose resistance to CPMMV was unknown. Therefore, the objective of the study was to determine the occurrence of Cowpea mild mottle disease (CPMMD) in cowpea growing areas of western Kenya and to pathotype its causal agent (CPMMV). Two disease diagnostic surveys were conducted during the short and long rain seasons of 2013 in the following Agro-ecological zones (AEZs) of western Kenya: low midland zone 1 (LM1), low midland zone 2 (LM2), low midland zone 3 (LM3), upper midland zone 1 (UM1), low midland zone 4 (LM4) and low highlands 1 (LH1). A disease score sheet was used to score incidence and severity. Symptomatic leafy samples were collected and analyzed using DAS-ELISA. The CPMMV isolate was mechanically inoculated on major legumes in screen house and symptoms recorded. Popularly grown cowpea varieties were screened for resistance to CPMMV. Data obtained was analyzed using Statistical Package for Social Scientist (SPSS - version 22.0) where Analysis of Variance (ANOVA) was used to compare means. Cowpea farms were found to be highly infected by viral diseases with incidences varying significantly among the AEZs and seasons. LM4 had the highest viral incidence (33.18%) followed by UM1 (26.64%). CPMMD was found widespread in all the AEZs surveyed except LH1. On individual farms however CPMMD incidence was as high as 90%. CPMMD was also recorded on groundnut farms across all the AEZs. Viral disease incidence positively correlated with severity. CPMMV, Cowpea aphid-borne mosaic virus (CABMV) and Cucumber mosaic virus (CMV) were detected in cowpea samples by DAS-ELISA. Most farmers sourced seeds from the local markets or used own seeds. Some seeds from local markets of western Kenya tested positive for CPMMV, CMV and CABMV. All the legumes and indicator plants tested were susceptible to CPMMV and expressed varied symptoms. All cowpea varieties screened were susceptible to CPMMV but viral titre varied significantly among the varieties. This is the first report of CPMMV in western Kenya. In conclusion, cowpea viral diseases are widespread in cowpea growing areas of western Kenya. This is attributed to use of uncertified seeds. The other reasons for this and other findings are discussed. Development and adoption of CPMMD resistant varieties as well as use of certified seeds is recommended.